



PHOTO: NIOSH/AMY FELKO

Sounding the Alarm on Dangerous Nail Guns

Research sparks awareness and federal agencies respond

The Challenge

Construction workers and a growing number of consumers use nail guns because they are easy and quick to use. However, their high speed comes at a price. Nail gun injuries account for nearly 40,000 emergency room visits each year – 60 percent involve workers and the rest involve consumers. Those with less experience suffer especially high injury rates. Between 1991 and 2005, for example, nail gun injuries to consumers increased by 200 percent. The fact that nail gun trigger mechanisms operate differently but look alike contributes to the problem. A contact trip trigger fires a nail whenever the trigger is squeezed and the nose of the gun bumps a surface, while a sequential trigger reduces the risk for an accidental firing because the nose of the gun must be pushed in before the user can pull the trigger. Adoption by manufacturers and users of the safer sequential trigger option has been slow.



The Response

A research team headed by Dr. Hester Lipscomb, a researcher at Duke University Medical Center's Division of Occupational and Environmental Medicine, working under a CPWR grant, examined the effects of nail gun triggers and training on injuries as well as productivity.

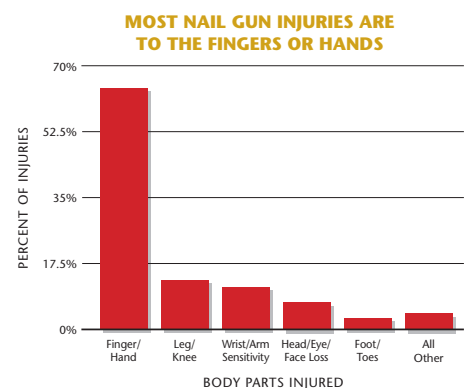
In collaboration with the Carpenters in St. Louis and the region's homebuilders associations, the team conducted a multi-year study of nail gun use. More than 2,000 apprentices completed written questionnaires that covered the types of nail gun triggers used, hours of nail gun use, and training. Roughly 500 apprentices who reported a nail gun injury participated in more in-depth interviews. At the same time, apprentices received training on the safe use of nail guns.

In addition, the team visited more than 200 building supply and home improvement stores to gather data on the sales staffs' knowledge of nail gun safety, the different trigger mechanisms, and the injury risk.

The Results

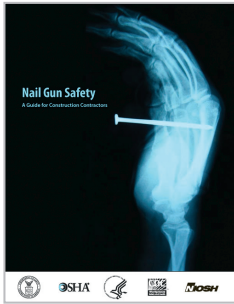
The research team found that training and the use of nail guns with sequential triggers substantially reduce the risk of injury. Their evaluation of two different trigger mechanisms showed that the risk of injury is double for users of nail guns with contact trip triggers, and that about 12 percent of injuries are to bystanders. As participating contractors and apprentices became more aware of the higher risk with the contact trip trigger, use of the safer sequential trigger increased. By the end of the study, apprentices were using a sequential trigger for more than 60 percent of their nailing hours. The researchers' finding that a worker's skill and experience, not the trigger mechanism, has the greatest effect on productivity also helped contractors' justify the switch to the safer sequential trigger.

Over the 4-year study, the researchers documented a 55 percent drop in injuries due to greater use of the safer sequential trigger mechanism and the introduction of training. While both actions contributed to this result, they found that switching from a contact trip trigger to a sequential trigger does the most to prevent injuries. The researchers also discovered that the majority of the nail gun sales staff interviewed could not correctly describe the differences between the two trigger mechanisms. This finding, along with the higher risk associated with contact trip triggers and the growing use of nail guns by consumers, supports their recommendations for nail guns to only be equipped with sequential triggers and for both suppliers and users to be trained on their use.



The CPWR IMPACT

Dr. Lipscomb's research is raising awareness of nail gun safety with government and industry, and prompting action:



- NIOSH and OSHA issued a joint guidance document, *Nail Gun Safety: A Guide for Construction Contractors*. The publication has received more than 250,000 online "hits" since its release in September 2011.
- A new website, *NailGunSafety: The Facts* (www.nailgunfacts.org), was set up as an information clearinghouse. The site went live in December 2011.

- Data from the studies has been picked up and used on a wide array of websites including one designed to help small contractors train their employees called *Nail Gun Injuries in Construction* (<http://blog.lib.umn.edu/scho0535/nailguninjuriesinconstruction/>).
- Media attention is raising public awareness of nail gun hazards and prevention, including a report published in the *Journal of Light Construction*, special features in the *Sacramento Bee* and by *ABC-15, Phoenix*, and articles in numerous construction and safety publications.

To learn more about the research and the CPWR impact, visit www.cpwr.com and click on "Research to Practice."

"Dr. Lipscomb and her colleagues identified the extent of the problem, the risk factors that lead to nail gun injuries, and the effectiveness of the most likely solutions. Yet this valuable information was not being taken up by the industry. So there was a clear need to take the research and turn it into guidance for contractors. That's what NIOSH and OSHA did. It is a very good example of r2p – research to practice."

—Matt Gillen, CIH, Deputy Director, NIOSH Office of Construction Safety and Health, Coordinator, NIOSH Construction Program NIOSH Office of the Director

What made it a success?

Recognizing and publicizing the safety implications for consumers as well as the construction work force contributed to the project's success.

Critical elements included:

- A commitment for a multi-year initiative from labor, management, and those involved in providing related training.
- Direct input from users of the equipment, including those who had suffered from a nail gun injury prior to the study.
- The opportunity to evaluate the knowledge and awareness of those selling and distributing the tool.

The researchers are continuing to share their findings with key government agencies, insurers, and consumer safety officials.



"There are a lot of problems in construction safety and health that are difficult to address. This is not one of them."

—Hester J. Lipscomb, PhD, Professor, Division of Occupational and Environmental Medicine, Duke University